[illegible] 7

[illegible], [illegible], [illegible] [illegible] [illegible]

Redeveloped Edition | Class 9 Science | IESC Series

Original NCERT content reimagined with everyday life examples, creative AI-enhanced exercises, and interdisciplinary insights.

[illegible] [illegible] [illegible] [illegible]

[illegible] 7:10 [illegible], [illegible] [illegible] [illegible] [illegible], [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible], [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] — [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] — [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

[illegible] [illegible] [illegible]: [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible], [illegible], [illegible] [illegible]?

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[illegible] [illegible] [illegible]

[illegible] [illegible] [illegible] [illegible], [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] (slide) [illegible] [illegible] [illegible] — [illegible], [illegible] [illegible] [illegible] [illegible] (chute) [illegible]

- [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] — [illegible] [illegible], [illegible], [illegible] [illegible] [illegible] [illegible]?

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>
> ***W = F × s*** *(□□□. 7.1 / 7.2)*

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1 J = 1 N × 1 m = 1 kg m s^{-2} × 1 m = 1 kg m^2 s^{-2}

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W = F × s □□, □□□□□ □□ □□□□□ □□□□ □□ □□ □□ □□ □□ □□□□□ □□, □□ □□□ □□□□□□□□□ □ □□ — □□□□ □□ □□□□□ □□ □□□□ □□□ □□□ □□ □□□□ □□□ □□□□□ □□ □□□ □□ □□□□□□ □□ □□□□ □ □□□□□ □□□□ □□□□□ □□□ □□□□ □□□□ □□□□□□□, □□ s = 0, □□□□□ □□□□□□□□□□ □□□ □□, □□ □□□□□ □□ □□□□□ □□□ □□□□ □□□ — □□□ □□ □□□□ □□□□□□□□□□□ □□□□□ □□□□□ □□□ □□ □□□ □□□ □□ □□□ □□□ □□□□□ □□□□ □□□□ □□ □□□□ □□□□ □□□□□□□□-□□□□□ □□ □□□-□□□

[illegible], [illegible]

[illegible]: [illegible]

[illegible], [illegible], [illegible] — [illegible], [illegible], [illegible], [illegible] ([illegible]) [illegible] — [illegible] (perpendicular) [illegible], [illegible], [illegible] ([illegible] — [illegible])

7.1.2 [illegible]

[illegible], [illegible], [illegible]

[illegible] — [illegible] — [illegible], [illegible] ([illegible], [illegible])[illegible]

[illegible] — [illegible]: [illegible]

[illegible]: [illegible] 200 N [illegible] 15 [illegible]

[illegible]: [illegible], [illegible] 12 [illegible], [illegible] 250 N [illegible]?

[illegible]: [illegible], [illegible]: s = −0.12 [illegible]

W = F × s = 250 N × (−0.12 [illegible]) = **−30 J**

[illegible], [illegible] — [illegible] 30 J [illegible], [illegible], [illegible], [illegible] (+30 J), [illegible]

[illegible]: [illegible]

[illegible], [illegible] — [illegible], s = 0, [illegible], [illegible], [illegible] ([illegible]-[illegible]), [illegible],

[illegible]

7.2 [illegible]-[illegible] [illegible]

[illegible], [illegible] — [illegible]? [illegible]: [illegible], [illegible], [illegible], [illegible] — [illegible]

[illegible]? [illegible]; [illegible]-[illegible] [illegible]:

> *[illegible]*
>
> *[illegible] = [illegible] ([illegible]. 7.3)*

[illegible], [illegible] — [illegible]-[illegible]-[illegible] [illegible]

[illegible] SI [illegible] — [illegible] (J)[illegible]

[illegible]: [illegible] (1818–1889)

[illegible], [illegible], [illegible]-[illegible] (brewery) [illegible], [illegible] — [illegible] — [illegible]-[illegible] [illegible] "[illegible]" [illegible], [illegible]

[illegible] — [illegible]: [illegible]

[illegible]: [illegible], [illegible] — [illegible] ([illegible] — [illegible] — [illegible])

[illegible]: [illegible] ([illegible] 15 [illegible]) [illegible] 2.5 [illegible]/[illegible] [illegible], [illegible] 1.0 [illegible]/[illegible] [illegible] ([illegible] 5 [illegible]) [illegible]

[illegible] — [illegible]:

[illegible]: $K = \tfrac{1}{2} \times 0.015\,\text{kg} \times (2.5$ [illegible]/[illegible]$)^2 = \tfrac{1}{2} \times 0.015 \times 6.25 = 0.047$ J

[illegible]: $K = \tfrac{1}{2} \times 0.015\,\text{kg} \times (1.0$ [illegible]/[illegible]$)^2 = \tfrac{1}{2} \times 0.015 \times 1 = 0.0075$ J [illegible] 0.039 J [illegible] — [illegible], [illegible] ([illegible]) [illegible], [illegible] ([illegible])। [illegible]-[illegible] [illegible] — [illegible], [illegible]-[illegible]-[illegible], [illegible]-[illegible] [illegible]।

[illegible]: [illegible]

[illegible], [illegible] — [illegible] ([illegible]), [illegible] ([illegible]), [illegible], [illegible] — [illegible]।

[illegible]: [illegible]

[illegible] — [illegible] — [illegible], [illegible] ([illegible]); [illegible], [illegible] 15 [illegible]; [illegible], [illegible]-[illegible]।

7.3 [illegible]

[illegible], [illegible]: [illegible]; [illegible]; [illegible]; [illegible]।

[illegible]: [illegible]

[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible], [illegible]

[illegible]-[illegible]: [illegible]-[illegible], [illegible], [illegible] — [illegible], [illegible], [illegible]/[illegible]; [illegible]

[illegible] — [illegible]: [illegible]-[illegible]

[illegible]: [illegible]-[illegible]

[illegible]: [illegible] — [illegible], [illegible], [illegible], [illegible]-[illegible] [illegible]-[illegible], [illegible] ([illegible]: [illegible] → [illegible] → [illegible])[illegible] "[illegible]" [illegible]

[illegible], [illegible] — [illegible]

7.4 [illegible]

[illegible]-[illegible], [illegible]-[illegible]

7.4.1 [illegible]

[illegible] **(kinetic energy)** [illegible], [illegible], [illegible]-[illegible] — [illegible]

[illegible] m [illegible], [illegible] F [illegible] s [illegible] u [illegible] v [illegible] $v^2 = u^2 + 2as$ [illegible]

[illegible], [illegible] $s = (v^2 - u^2)/(2a)$ [illegible] $W = F \times s = ma \times s$ ([illegible], $F = ma$ [illegible]):

$$W = ma \times (v^2 - u^2)/(2a) = \tfrac{1}{2} m(v^2 - u^2) \quad ([illegible]. 7.5)$$

[illegible]-[illegible], [illegible] ($u = 0$), [illegible], [illegible] v [illegible] m [illegible]:

> *[illegible]*
>
> *$K = \tfrac{1}{2} mv^2$ ([illegible]. 7.6)*

[illegible] ([illegible], [illegible]) [illegible], [illegible] K [illegible]; [illegible], [illegible]; [illegible], [illegible] K [illegible]

[illegible] — [illegible]: [illegible]-[illegible]

[illegible]: [illegible], [illegible]?

[illegible]: [illegible]-[illegible] v [illegible], [illegible] $\tfrac{1}{2}mv^2$ [illegible] $2v$ [illegible], [illegible]?

$$K_{[illegible]} = \tfrac{1}{2} m(2v)^2 = \tfrac{1}{2} m \times 4v^2 = 4 \times (\tfrac{1}{2} mv^2) = 4 \times K_{[illegible]}$$

[illegible] — [illegible]-[illegible] [illegible]-[illegible]: 40 [illegible]/[illegible] 20 [illegible]/[illegible] — [illegible] "[illegible]" [illegible], [illegible]

[illegible] — [illegible]: [illegible]

[illegible]: [illegible] 0.2 [illegible] 154.8 [illegible]/[illegible] — [illegible]

[illegible] ([illegible] — [illegible]): [illegible] 150 [illegible]/[illegible] 0.2 [illegible] 154.8 [illegible]/[illegible]

[illegible]: 154.8 [illegible]/[illegible] = 154.8 × (1000/3600) [illegible]/[illegible] ≈ 43 [illegible]/[illegible]

$K = \tfrac{1}{2} mv^2 = \tfrac{1}{2} \times 0.2\ \text{kg} \times (43\ [illegible]/[illegible])^2 = \tfrac{1}{2} \times 0.2 \times 1849 =$ **184.9 J**

[illegible] 1.8 [illegible] 10 [illegible] — [illegible] 160 [illegible]

[illegible]: INS [illegible]

[illegible] INS [illegible]; [illegible], [illegible] — [illegible]

[illegible] — [illegible]: [illegible]

15,000 [illegible], [illegible] 367,500 N [illegible], [illegible] 100 [illegible]?

[illegible] $KE = \frac{1}{2} \times 15000\ \text{kg} \times v^2$ [illegible] $KE = 0\ \text{J}$ [illegible]

[illegible] $= F \times s = 367500\ \text{N} \times (-100$ [illegible]$) = -36{,}750{,}000\ \text{J}$ ([illegible]: [illegible])

[illegible]-[illegible]: KE [illegible] = [illegible]

$0 - \frac{1}{2} \times 15000 \times v^2 = -36{,}750{,}000\ \text{J} \Longrightarrow v^2 = (36{,}750{,}000 \times 2)/15000 = 4900$ [illegible]^2/[illegible]^2

$v = 70$ [illegible]/[illegible] = 252 [illegible]/[illegible] — [illegible]

7.4.2 [illegible]

[illegible]? [illegible] — [illegible], [illegible]? [illegible], [illegible] (deform) [illegible]

[illegible], [illegible]: [illegible]-[illegible], [illegible]-[illegible], [illegible] — [illegible]-[illegible], [illegible]

> *[illegible]*
>
> *[illegible], [illegible]*

[illegible]

[illegible], [illegible]-[illegible] "[illegible]" [illegible]

[illegible], [illegible] **(gravitational potential energy)** [illegible]

[illegible] — [illegible]: [illegible]

[illegible]: [illegible]-[illegible]

[illegible]: [illegible] ([illegible] 1.5 [illegible]) [illegible] 4 [illegible], [illegible] 10 [illegible], [illegible]-[illegible]-[illegible]?

[illegible], [illegible] — [illegible], [illegible] 10 [illegible] 4 [illegible]

[illegible], [illegible] m [illegible], [illegible] h [illegible], [illegible] mg [illegible]:

$W =$ [illegible] $\times$ [illegible] $= mg \times h = mgh$ ([illegible]. 7.7)

[illegible]-[illegible], [illegible] h [illegible] U [illegible]:

> *[illegible]*
>
> $U = mgh$ ([illegible]. 7.8)

[illegible], [illegible] (J) [illegible] ([illegible]: [illegible], [illegible] g [illegible])

[illegible] — [illegible]: [illegible]

[illegible]: [illegible] 200 [illegible] 10 [illegible] — [illegible] ($g = 10$ [illegible]/[illegible]^2)[illegible]

$U = mgh = 0.2\,\text{kg} \times 10$ [illegible]/[illegible]^2 $\times\ 10$ [illegible] $=$ **20 J**

7.4.3 [illegible]

[illegible] **(mechanical energy)** [illegible] h [illegible] m [illegible] ([illegible])[illegible], [illegible]: $mgh + 0 = mgh$[illegible]-[illegible] t [illegible], $v = gt$ [illegible] $h' = h - \frac{1}{2}gt^2$ [illegible], [illegible] $mgh - \frac{1}{2}mg^2t^2$ [illegible], [illegible] $\frac{1}{2}mv^2 = \frac{1}{2}mg^2t^2$ [illegible] t-[illegible]:

[illegible] $= (mgh - \frac{1}{2}mg^2t^2) + \frac{1}{2}mg^2t^2 = mgh$ — [illegible]

[illegible]: [illegible] ([illegible]), [illegible] — [illegible] ([illegible]), [illegible]

[illegible] — [illegible]: [illegible]

[illegible]: [illegible] (pendulum) [illegible], [illegible]-[illegible], [illegible] (bob) [illegible]

[illegible]: [illegible], [illegible] ([illegible], [illegible]) [illegible]

[illegible], [illegible] — [illegible], [illegible], [illegible] — [illegible], [illegible] ([illegible]) [illegible], [illegible] — "[illegible]," [illegible]-[illegible], [illegible]

[illegible] — [illegible]: [illegible]-[illegible]

[illegible]: [illegible] h [illegible]? ([illegible] "[illegible]" [illegible])

[illegible]: [illegible], [illegible] h [illegible], [illegible]?

[illegible] $= mgh$[illegible] $= \frac{1}{2}mv^2$[illegible]

[illegible]: $\frac{1}{2}mv^2 = mgh \Longrightarrow$ **$v = \sqrt{2gh}$**

[illegible] — [illegible] ([illegible], [illegible], [illegible]), [illegible]! [illegible]

[illegible] — [illegible]: [illegible]

[illegible]: [illegible]; [illegible] 30° [illegible]/[illegible]-[illegible], [illegible] — [illegible]-[illegible]

[illegible] ([illegible] **—** [illegible]

[illegible]): 72 [illegible]/[illegible] (= 20 [illegible]/[illegible]) [illegible] 10,000 [illegible] 30° [illegible]-[illegible], [illegible] 50,000 N [illegible] ([illegible]: 30° [illegible], [illegible] 2 [illegible] 1 [illegible])

[illegible] $KE = \frac{1}{2} \times 10000\ \mathrm{kg} \times (20\ \text{[illegible]}/\text{[illegible]})^2 = 2{,}000{,}000\ \mathrm{J}$[illegible] $PE = 0$[illegible]

[illegible] d = [illegible] = d/2[illegible]

[illegible] $PE = mg \times (d/2) = 10000 \times 10 \times (d/2) = 50{,}000\ \mathrm{N} \times d$[illegible] $KE = 0$[illegible]

[illegible] $= -50{,}000\ \mathrm{N} \times d =$ [illegible] $= (50{,}000\ \mathrm{N} \times d) - 2{,}000{,}000\ \mathrm{J}$

$2{,}000{,}000\ \mathrm{J} = 100{,}000\ \mathrm{N} \times d \Longrightarrow$ **d = 20 [illegible]**

[illegible]-[illegible] 20 [illegible]

[illegible]: [illegible]

[illegible] — [illegible] (perpetual motion machine)? [illegible], [illegible]: 12 [illegible]-[illegible] ([illegible]) [illegible], [illegible], [illegible], [illegible], [illegible] — [illegible] — [illegible], [illegible]: [illegible], [illegible]

7.5 [illegible]

[illegible] 20 [illegible] 2 [illegible]-[illegible] — [illegible] ([illegible], [illegible]) [illegible], [illegible] **[illegible] (power)** [illegible]

> *[illegible]*
>
> *[illegible] = [illegible] ÷ [illegible]*
>
> $P = W / t$ *([illegible]. 7.11)*

[illegible] SI [illegible] (W) [illegible]: 1 W = 1 J/[illegible], [illegible], [illegible]

[illegible]: [illegible] (1736–1819)

[illegible], [illegible] 18 [illegible], [illegible], [illegible]-[illegible] — [illegible] (horsepower, hp) [illegible] 1 hp = 746 W, [illegible]

[illegible]: [illegible] '1 HP [illegible]'

[illegible] '1 HP' [illegible] '0.5 HP' [illegible] — [illegible]-[illegible], [illegible], [illegible]. 7.11 [illegible]-[illegible] [illegible]-[illegible] — 250 W, 1000 W, 3000 W — [illegible], [illegible] ([illegible]) [illegible]

[illegible] — [illegible]: [illegible]-[illegible]

[illegible]: [illegible] 5 [illegible] 75 [illegible] 2 [illegible] — [illegible]

[illegible] = mgh = 75 kg × 10 [illegible]/[illegible]^2 × 2 [illegible] = 1500 J

[illegible] = 1500 J / 5 [illegible] = **300 W**

[illegible] — [illegible]: [illegible]-[illegible]

[illegible]: [illegible] 1000 [illegible] 72 [illegible]/[illegible] [illegible] 10 [illegible] — [illegible]

[illegible]: [illegible]-[illegible], [illegible] 1000 [illegible], [illegible] 72 [illegible]/[illegible] = 20 [illegible]/[illegible] [illegible] 10 [illegible]

[illegible] = [illegible] KE − [illegible] KE = ½ × 1000 kg × (20 [illegible]/[illegible])^2 − 0 = 200,000 J

[illegible] = 200,000 J / 10 [illegible] = **20,000 W = 20 kW (≈ 27 hp)**

7.6 [illegible]

[illegible] — [illegible], [illegible], [illegible]

[illegible] **(simple machines)** [illegible]

[illegible] **(effort)** [illegible]; [illegible] **(load)** [illegible]:

> *[illegible]*
>
> *[illegible] = [illegible] ÷ [illegible]*
>
> ***[illegible] = load / effort** ([illegible]. 7.12)*

[illegible] — [illegible], [illegible] (inclined plane), [illegible] (lever)[illegible]

7.6.1 [illegible] (Pulley)

[illegible] — [illegible], [illegible], [illegible] 1 [illegible]

> **[illegible]: [illegible] ([illegible])**
>
> [illegible], [illegible] — [illegible], [illegible] ([illegible] 1!), [illegible] — [illegible], [illegible]
>
> [illegible]-[illegible]-[illegible], [illegible]-[illegible] — [illegible] (movable pulley) [illegible] ([illegible] 1 [illegible]) [illegible], [illegible]

> **[illegible]: [illegible]**
>
> [illegible] — [illegible] — 1 [illegible], [illegible], [illegible], [illegible], [illegible]-[illegible] — [illegible]

7.6.2 [illegible] (Inclined Plane)

[illegible] — [illegible]

> **[illegible] — [illegible]: [illegible]**

[illegible]: [illegible], [illegible]-[illegible] [illegible]

[illegible]: [illegible] — [illegible], [illegible], [illegible], [illegible] (a) [illegible], [illegible] (b) [illegible] ([illegible], [illegible]) [illegible]

[illegible] — [illegible]

[illegible] m [illegible] ([illegible] mg [illegible]), F′ [illegible] h [illegible] L [illegible] ([illegible]), [illegible]-[illegible]:

[illegible] $= F' \times L =$ [illegible] $= mgh$, [illegible] $mg/F' = L/h$

> *[illegible]*
>
> *[illegible] = [illegible] / [illegible] = $mg/F' = L/h$ ([illegible]. 7.13)*

[illegible] $L > h$, [illegible] 1 [illegible] — [illegible]

[illegible]: [illegible]

[illegible] — [illegible], [illegible]-[illegible] [illegible], [illegible] ([illegible], [illegible]) [illegible], [illegible] — [illegible] — [illegible]. 7.13 [illegible]-[illegible] [illegible]

[illegible] — [illegible]: [illegible]-[illegible] [illegible]

[illegible]: [illegible] 30 [illegible]; [illegible] 40 [illegible] ([illegible] 40 [illegible]) — [illegible]

[illegible] ([illegible] — [illegible]): [illegible]-[illegible] 40 [illegible] 30 [illegible]?

[illegible]: $L^2 = 30^2 + 40^2 = 900 + 1600 = 2500$, [illegible] $L =$

50 [illegible]

[illegible] = L/h = 50 [illegible] / 30 [illegible] = **1.67**

7.6.3 [illegible] (Lever)

[illegible] **(fulcrum)** [illegible]: [illegible], [illegible] ([illegible]), [illegible] ([illegible] [illegible] **[illegible]-[illegible] (load arm)** [illegible]; [illegible] **[illegible]-[illegible] (effort arm)** [illegible]

[illegible] — [illegible]: [illegible]

[illegible]: [illegible] 30 [illegible], [illegible], [illegible]

[illegible]: [illegible] 30 [illegible], [illegible], [illegible] ("[illegible]" [illegible]), [illegible] ("[illegible]" [illegible]) [illegible], [illegible]

[illegible] F_1 [illegible] d_1 [illegible], [illegible] F_2 [illegible] d_2 [illegible], [illegible] ([illegible]. 7.1):

$F_1 \times d_1 = F_2 \times d_2$ ([illegible]. 7.14)

[illegible] — [illegible]: [illegible]

[illegible]: [illegible], [illegible], [illegible]

[illegible]: [illegible] — [illegible]: [illegible] ([illegible]) [illegible], [illegible] [illegible]-[illegible] [illegible] 1 [illegible] — [illegible] 2 [illegible]; [illegible], [illegible] 4 [illegible] 8 [illegible]

[illegible]: $n_1 \times L_1 = n_2 \times L_2$ — [illegible],

[illegible] × [illegible]-[illegible] = [illegible] × [illegible]-[illegible] ([illegible]. 7.15)

> *[illegible]*
>
> *[illegible] = [illegible] / [illegible] = [illegible]-[illegible] / [illegible]-[illegible] ([illegible]. 7.16)*

[illegible]-[illegible] [illegible]-[illegible] [illegible] — [illegible],

[illegible], [illegible]

[illegible] — [illegible]: [illegible]-[illegible] [illegible]

[illegible]: [illegible] A, B, D, E [illegible] C (AC = EC = 2 [illegible], BC = DC = 1 [illegible]) [illegible]-[illegible] [illegible], [illegible] 15 [illegible] 30 [illegible]?

15 [illegible] A ([illegible] C [illegible] 2 [illegible]) [illegible] 30 [illegible] L [illegible]

15 kg × 2 [illegible] = 30 kg × L ⟹ **L = 1** [illegible] — [illegible] 30 [illegible] D [illegible]

[illegible], [illegible], [illegible]:

[illegible]: [illegible]

[illegible]	[illegible]	[illegible]
[illegible] I	[illegible]	[illegible], [illegible], [illegible], [illegible], [illegible]-[illegible], [illegible]
[illegible] II	[illegible]	[illegible], [illegible], [illegible] ([illegible])
[illegible] III	[illegible]	[illegible], [illegible], [illegible], [illegible], [illegible]

[illegible]? [illegible]-[illegible] [illegible]-[illegible] [illegible], [illegible]. 7.16 [illegible] ([illegible]-[illegible]) [illegible] — [illegible]-[illegible] [illegible]-[illegible] [illegible], [illegible]

[illegible]: [illegible]. [illegible] (1861–1962)

[illegible], [illegible] (KRS) [illegible]-[illegible] [illegible]-[illegible] [illegible] — [illegible], [illegible], 15 [illegible], [illegible], [illegible]

[illegible]: [illegible]

[illegible], [illegible]; [illegible]-[illegible], [illegible], [illegible], [illegible] [illegible]-[illegible] — [illegible], [illegible], [illegible] — [illegible]

[illegible] — [illegible]-[illegible] — [illegible]; [illegible], [illegible], [illegible]

[illegible]

[illegible]	[illegible]	[illegible]
[illegible]	W = F × s; [illegible]	[illegible]; [illegible]
[illegible]-[illegible]	[illegible] = [illegible]	[illegible]
[illegible]	[illegible], [illegible], [illegible], [illegible], [illegible], [illegible], [illegible]	[illegible]: [illegible] → [illegible] → [illegible]/[illegible]
[illegible]	$K = ½mv^2$; [illegible]	[illegible]-[illegible]
[illegible]	$U = mgh$; [illegible]/[illegible]	[illegible]; [illegible]
[illegible]	[illegible] KE + PE [illegible]	[illegible]
[illegible]	$P = W/t$; SI [illegible] (1 hp = 746 W)	[illegible] '1 HP' [illegible]; [illegible]-[illegible]
[illegible]	[illegible] = [illegible]/[illegible]; [illegible], [illegible]	[illegible], [illegible], [illegible]

[illegible], [illegible], [illegible] — [illegible]

[illegible]

1. [illegible], "[illegible], [illegible]" [illegible]

[illegible], [illegible], [illegible]

2. [illegible]-[illegible], [illegible], [illegible], [illegible] SI [illegible]
3. [illegible], [illegible]?

[illegible]

1. ([illegible]) [illegible], [illegible], [illegible] 100 [illegible] 5 [illegible] 36 [illegible]/[illegible] (i) [illegible], [illegible] (ii) [illegible]
2. [illegible] 40 [illegible] 2 [illegible]-[illegible] $g = 10$ [illegible]/[illegible]^2 [illegible], [illegible]? [illegible], [illegible] — [illegible]?
3. [illegible] '[illegible]' [illegible], [illegible], [illegible], [illegible]

[illegible]

1. **[illegible]-[illegible] [illegible]:** [illegible]; [illegible], [illegible]-[illegible] [illegible]? [illegible]
2. **[illegible]:** [illegible] 3 [illegible] ([illegible] 15 [illegible]) [illegible]-[illegible]-[illegible], [illegible], [illegible]
3. **[illegible]:** [illegible] ([illegible]: [illegible], [illegible], [illegible])[illegible] ([illegible], [illegible], [illegible]) [illegible], [illegible], [illegible]
4. **AI [illegible] — [illegible]:** [illegible]-[illegible], [illegible] ([illegible]) [illegible] (~250 kcal ≈ 1,046,000 J) [illegible] "[illegible]" [illegible]

[illegible] — [illegible]

[illegible] A: [illegible]

[illegible] — [illegible], [illegible], [illegible] ([illegible]), [illegible], [illegible], [illegible] — [illegible], [illegible], [illegible], [illegible], [illegible], [illegible] ([illegible]. 7.13 [illegible] 7.16) [illegible], [illegible]-[illegible] ([illegible]: [illegible] "[illegible]" [illegible]) [illegible]?

[illegible] B: [illegible] (simulate) [illegible]

PhET [illegible] Energy Skate Park, Pendulum Lab, [illegible] Masses and Springs [illegible] (phet.colorado.edu [illegible])[illegible] [illegible], [illegible], [illegible], [illegible]-[illegible] [illegible] (150–200 [illegible]) [illegible]

[illegible] C: [illegible]

[illegible] — [illegible], [illegible], [illegible], [illegible] "[illegible]" [illegible], [illegible] ([illegible]) [illegible]-[illegible] [illegible], [illegible]: [illegible] 7.4.3 [illegible], [illegible]? [illegible] (cosmologist) [illegible], [illegible]?

[illegible]! [illegible], [illegible], [illegible] — [illegible]⚙